

GEOMETRICAL SURFACE DATA FOR A KOREAN ADULT**

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요 약

이 연구의 목적은 복사공간에서 한국 성인을 위한 기하학적 표면 데이터 파일을 만드는데 있다. 특히, 이 논문에서는 한국 성인의 기하학적 표면 데이터 파일을 만들기 위해, 컴퓨터화된 인간 마네킨과 프로그램을 사용한다. 이 데이터 파일은 3012개 삼각형의 x, y , 그리고 z 좌표로 구성되어 있다. 이 기하학적 표면 데이터는 한국 성인의 표면적, 투사면적, 그리고 형태 계수를 구하는데 중요한 자료이다.

INTRODUCTION

In recent years, considerable attention has been given to radiant heating as a method of providing comfort. Compared to convective heating, a radiantly heated room maintains a lower ambient air temperature while providing equal levels of comfort, because radiation heats the surfaces in a room without directly heating the air. Setting the thermostat at a lower temperature while maintaining equal comfort is one reason radiant heating saves energy.

Other advantages of radiant heating are less sound, vibration, and dust problems when compared with convection heating which are big concerns in electronic manufacturing factories.

Even though there are many advantages in using radiant heating systems, the angle factors and comfort design procedures for Korean adult have not been heretofore determined.

The purpose of this paper is to provide the geometrical surface data files for Korean adult in radiantly heated enclosures.

In particular this paper has generated the geometrical surface data files for a Korean adult with the aid of a computerized human mannequin and computer program.

Development of a geometrical surface data file is needed to create the surface area, projected area, and form factor.

DESCRIPTION OF METHOD TO CREATE GEOMETRICAL SURFACE DATA FOR KOREAN ADULT

Development of the geometrical body surface data files for a Korean adult is the first step in the comfort design

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procedure for radiant enclosures. There are many methods to create the DXF (direct interchange) files. One of them is to use the Mannequin computer program data base. Mannequin is an ergonomic drawing and design program that draws 3-D human forms. Mannequin uses a triangulated three dimensional surface to model humans. Using Mannequin, the pose and age for a human can be chosen for each design space. The method used to create the DXF file and to develop a geometrical surface data file for a Korean adult using the Mannequin computer program is as follows:

- choose the center point $x = 0.0$, $y =$ below floor level in the design pose (stand pose is chosen).
- choose the bottom view using above step.
- save DXF file. 3D, DXF function using above step.
- find the number of points (vertices), which is at the 71 code number at the DXF file.
- find the number of faces (triangles) in each part, which is at the 72 code number at the DXF file.
- find the number of vertices (points).
- find the number of triangles (faces).
- modify DXF file for a Korean adult and repeat above steps.
- subtract the x, y, and z components of each triangle which will be data file of the human body.

RESULT

The number of vertices (points) and triangle (faces) produced for each figure by the Mannequin computer program are as follows:

NAME OF PART	NUMBER OF POINT	NUMBER OF TRIANGLE
Chest A	204	350
Neck A	40	48
L Arm A	45	54
R Arm A	40	50
Abdomen A	143	236
L Leg A	68	104
R Ldpeg A	68	104
L Farm A	55	80
R Farm A	54	78
L Lowleg A	106	168
R Lowleg A	106	168
L Foot A	155	203
R Palm A	85	122
L Palm A	69	93
R Foot A	158	207
Head A	148	254
L Thumb 1A	33	43
L Thumb 2A	22	20
L Thumb 3A	22	25
L Index 1A	22	20
L Index 2A	21	20
L Index 3A	22	25
L Mid 1A	22	20
L Mid 2A	21	20
L Mid 3A	22	25
L Ring 1A	22	20
L Ring 2A	20	20
L Ring 3A	21	25
L Litt 1A	22	20
L Litt 2A	21	20
L Litt 3A	20	25
R Thumb 1A	32	40
R Thumb 2A	22	20
R Ythumb 3A	22	25
R Index 1A	22	20
R Index 2A	22	20
R Index 3A	22	25
R Mid 1A	22	20
R Mid 2A	21	20
R Mid 3A	22	25
R Ring 1A	22	20
R Ring 2A	21	20
R Ring 3A	21	25
R Litt 1A	21	20
R Litt 2A	20	20
R Litt 3A	21	25
TOTAL	2210	3012

The DXF for a Korean adult posing stand is consist with 100,000 lines with number and text Using this file and computer program, the x, y, and z components of each triangle can be created.

CONCLUSION

The height of a Korean adult in the modified Mannequin program is 170.9 cm.

The geometrical surface data files for a Korean adult are consisted of 3,012 triangles.

The part of data is at the following page.

This data is consisted with x, y, and z components of each triangle of Korean adult posing stand.

This data file is important to create the surface area, projected area, and form factor for Korean adult. More study is needed to create various kinds of poses and ages.

-14.3255996704	114.3507995605	1.1684000492
-13.6143999100	105.3083953857	2.1844000816
-12.1919994354	109.8804016113	4.7244000435
-13.4619998932	114.4015960693	2.9463999271
-12.1919994354	109.8804016113	4.7244000435
- 6.7055997849	110.9980010986	7.7216000557
- 7.0103998184	114.6047973633	8.6868000031
- 6.7055997849	110.9980010986	7.7216000557
- 3.4544000626	110.9980010986	8.7883996964
-3.6068000793	114.6047973633	10.1091995239
-3.4544000626	110.9980010986	8.7883996964
0.3555999994	111.3535995483	8.3819999695
0.4571999907	114.6556015015	9.5503997803
0.3555999994	111.3535995483	8.3819999695
3.3527998924	111.3027954102	8.5343999863
0.4571999907	114.6556015015	9.5503997803
3.3527998924	111.3027954102	8.5343999863
8.5852003098	110.7947998047	6.0960001945
4.2671999931	114.7063980103	9.7536001205
8.5852003098	110.7947998047	6.0960001945
11.4807996750	109.8804016113	4.0640001297
9.1947994232	114.4524002075	7.2136001587
11.4807996750	109.8804016113	4.0640001297
14.3255996704	104.6479949951	1.4223999977
12.1412000656	114.3507995605	4.4703998566
14.3255996704	104.6479949951	1.4223999977

350

- 0.4571999907	111.9631958008	-5.5371999741
- 4.2671999931	111.8107986450	-6.2484002113
- 4.3688001633	114.706398010	-7.4168000221
- 4.2671999931	111.8107986450	-6.2484002113
- 8.3819999695	111.3535995483	-5.8420000076
- 4.3688001633	114.7063980103	-7.4168000221
- 8.3819999695	111.3535995483	-5.8420000076
-12.0395994186	109.5755996704	-3.6068000793
- 9.423994064	114.4524002075	-6.9088001251
-12.0395994186	109.5755996704	-3.6068000793
-13.7159996033	105.4099960327	-1.5240000486
-13.3095998764	114.6047973633	-4.5212001801
-13.7159996033	105.4099960327	-1.5240000486
-14.0207996368	105.0543975830	0.3048000038
-14.3255996704	114.5031967163	-1.9304000139
-14.0207996368	105.0543975830	0.3048000038
-13.6143999100	105.3083953857	2.1844000816

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